

January 2011 • [www.army.mil/soldiers](http://www.army.mil/soldiers)

# Soldiers

The Official U.S. Army Magazine

**Modernizing the force**



# 2011

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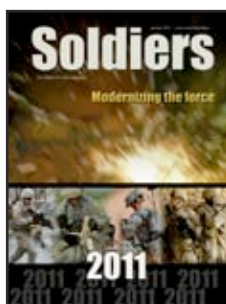


# Soldiers

January 2011 • VOLUME 66, NO. 1



Sgt. Larry J. Isbell, representing the Army National Guard, watches his firing lane for targets during the M4 carbine range qualification event of the Army's Best Warrior Competition, held on Fort Lee, Va., Oct. 21. For more information about the M4 and other weapons, see page 35. (Photo by Spc. Venessa Hernandez)



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◀ January 2011 - Modernizing the force

[ Coming Next Month ]

February 2011 - Stories from around the Army



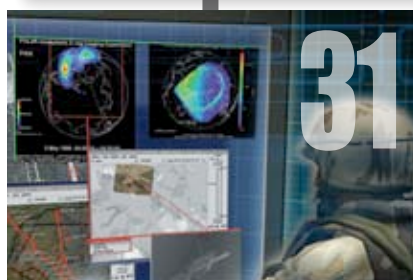


Indiana National Guard Soldiers of Battery A, 2nd Battalion, 150th Field Artillery Regiment, fire the M777 howitzer at Camp Atterbury Joint Maneuver Training Center in central Indiana, Nov. 4. The Indiana Guard is one of the first states to be issued these new pieces. For more information about the M777's new projectile, see page 30. (Photo by Sgt. John Crosby)

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January 2011

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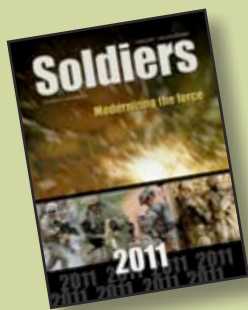
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**DEPARTMENT OF DEFENSE**  
DEFENSE MEDIA ACTIVITY-ARMY  
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January 1, 2011

The Army is committed to building and sustaining a force equipped with the modern gear, weapons and systems necessary to perform full-spectrum operations, while maintaining full transparency and fiscal stewardship.

Throughout 2010, the Army Modernization effort has led to the development and fielding of the best equipment available. The Army continues to modernize its varied arsenal through procurement of new equipment and upgrades to the existing inventory.

Leaders at all levels, researchers and developers have worked closely with Soldiers to update the Army's equipping strategy—a strategy based not only on input from the field, but lessons learned and changes to the strategic and fiscal landscapes.

As we transition to the new year, leaders are determined to provide Soldiers with the materiel they need to be successful in the current operating environments, and devoted to transforming the Army to meet the demands of the future.

This month's issue of Soldiers magazine provides a look at some of the modernization efforts from throughout 2010, and a glimpse at what is on the horizon.

Sincerely,

A handwritten signature in black ink, reading "MaryAnn B. Cummings", is positioned above the typed name.

MaryAnn B. Cummings  
Director, Army Production  
Defense Media Activity







# *Modernizing and equipping the force*

**S**OLDIERS comprise the centerpiece of our formations. The Army modernizes for its Soldiers so that they have the right equipment and capabilities for the mission.

The objective of Army modernization is to develop and field a versatile and affordable mix of the best equipment available to allow Soldiers and units to succeed in both today and tomorrow's full-spectrum operations.

As Soldiers in the field request new capabilities, the Army will ensure that the systems provided are versatile, tailorable and networked, so that they will remain dominant and relevant on future battlefields.

The following articles highlight a cross-section of the Army's ongoing efforts in achieving its modernization goals. ♦





## *Pushing limits of small-arms performance*

**T**ODAY'S battlefields feature an ever-adapting breed of enemy combatants. Soldiers are faced with many challenges deploying small arms in our current theaters of operation, including increased ranges, difficult terrain, and intermediate barriers. The M855A1 Enhanced Performance Round helps Soldiers meet those challenges by providing more consistent soft-target performance, increased hard-target penetration, better accuracy, reduced muzzle flash and higher muzzle velocity.

To understand soft target consistency, one must understand how a bullet behaves as it travels along its

trajectory. All bullets wobble while in flight. This is called yaw (which can be high or low), and pitch (left or right), causing bullets to strike targets differently, sometimes producing different effects. The new EPR, however, provides excellent performance every time, regardless of yaw angle. The Army Research Laboratory has verified that the M855A1 is superior to the M80 7.62 mm against soft targets.

The enemy uses cover in an engagement. Defeating that threat requires a bullet that can penetrate hard barriers. The EPR's exposed penetrator is larger and sharper than the M855's, and is capable of penetrating 3/8-inch-thick

steel at ranges approaching 400 meters. This is far better than the M80 7.62 mm. EPR can penetrate cinder blocks at up to 80 meters. The current 5.56 mm cartridge can't penetrate this type of barrier at any range.

Further, it is more effective at extended ranges and more accurate than the current M855. Accuracy testing showed that on average, 95 percent of bullets hit within an 8-by-8-inch target at 600 yards. ♦

*—Program Manager for Maneuver Ammunition Systems*

The M855A1 Enhanced Performance Round resulted in a number of significant enhancements not found in the current round. These include improved hard target capability, more dependable, consistent performance at all distances, improved accuracy, reduced muzzle flash and a higher velocity.







## *Insensitive munitions saving lives*

Picatinny Arsenal, N.J., hosted a Soldier home on mid-tour leave from Afghanistan in October 2009. The Soldier, the son of a Picatinny employee, was a mortarman with the 10th Mountain Division. While at Picatinny, he spoke with Project Manager—Combat Ammunition Systems, and Armament Research, Development and Engineering Center employees about his experiences with Picatinny-developed munitions.

In September 2009, a powerful improvised explosive device destroyed a Mine-Resistant, Ambush-Protected vehicle he was travelling in. It ruptured the vehicle's hull and fuel tank and

engulfed the vehicle interior in flames, including 16, M768 60 mm mortar cartridges that were inside the cabin with the seven-man crew.

After the MRAP had stopped burning, Soldiers found all of the M768 shell bodies intact. They also found the remains of the fuses, which had separated from the cartridges, allowing the explosive fill to burn rather than explode. Although several Soldiers were seriously injured in the ambush, all survived. Thanks to the insensitive munitions feature of the M768 cartridges, a much greater disaster was averted.

Insensitive munitions are designed to resist unplanned detonation by

fast or slow cook-off, bullet impact, fragment impact, shaped charge jet impact or sympathetic detonation. The M768 incorporates several IM features, including new explosive materials and a plastic fuse adaptor that melts in a fire, allowing the fuse to separate from the cartridge. This relieves internal pressure and prevents detonation of the explosive fill.

The M768 cartridge is one of the early success stories in a plan that the Program Executive Office for Ammunition is implementing to develop and produce safer ammunition.

There are also plans for improving the IM characteristics for packaging, explosive fills, propellants and fuses for calibers up to 155 mm. Two 155 mm high-explosive projectiles, the M795A1 and the M1122 (a new IM training projectile), developed with sponsorship by Office of the Secretary of Defense's Technology Transition Initiative program, are both expected to reach the field in 2011. ♦

—Project Manager Combat Ammunition Systems



Interior view of the MRAP after the fire. An unexploded shell body from a M768 cartridge can be seen at the lower left.





## *The LAW is back*

**W**ARFIGHTERS now have an improved shoulder-launched weapon system that lightens the Soldier's load and improves his mobility on the battlefield. An upgraded M72 Light Assault Weapon is back and actively supporting Soldiers and Marines in the fight.

The new LAW is ideal for the combat environment in Afghanistan, characterized by difficult terrain, high elevations, long foot patrols and fast-paced operations against insurgents, who are often protected by structures and fighting at close range.

According to 3rd Brigade Combat Team, 10th Mountain Division's lessons learned feedback from their time in Afghanistan, "The M72s provided the best balance of weight and bulk (for) combat effectiveness. It was an excellent munition to use against in-

surgers firing from close and medium range. It was both a good suppressive weapon and at the same time quite accurate and lethal."

Derived from its 66 mm, man-portable, direct-fire predecessor, the improved LAW is a more effective, easier-to-use weapon. The M72A7 weighs 8 pounds with a normal carry length of 30.5 inches, extending to 38.5 inches for firing.

The improved rocket motor is capable of carrying the warhead to the target at higher velocity and can accurately engage targets in excess of 200 meters. The use of an insensitive explosive in the shaped charge warhead makes the system safer, as it is less vulnerable to fragments from exploding munitions or small-arms fire. The M72A7 integrates the Picatinny Rail, a bracket that provides a standardized

mounting platform for laser pointers or other alternative sights for night operations, making it more versatile than previous versions.

To reduce the training expense of firing the new M72s, a 21mm, sub-caliber trainer and rocket is available. The trainer is effective in replicating the sight picture, operator controls and backblast. The sub-caliber rocket includes a tracer, allowing Soldiers to train effectively under realistic conditions with immediate feedback. The M72 training system is easy to use and enables Soldiers to maintain safety discipline required by the tactical round.

The payoff of the weapon and training is in combat. According to Soldiers from the 10th Mountain Division, "The M72s were fast and easy to bring into operation. Not only were they easy to carry, once fired, the empty launch tube could be collapsed and re-stowed more easily than other launchers." ♦

—Program Manager Soldier Weapons

Soldiers from the 2nd Stryker Cavalry Regiment, Stryker Brigade Combat Team train on the M72A7 LAW in Vilseck, Germany.







## *GCV designed for protection, flexibility to adapt*

**T**HE Army is on a mission to provide a new infantry fighting vehicle to the warfighter. In 2010, the Army matured the requirements for a new Ground Combat Vehicle to replace the Bradley Infantry Fighting Vehicle. Lessons learned from more than nine years of combat and experiences from warfighters helped the Army identify critical capability gaps that exist across the service.

While the Bradley Infantry Fighting Vehicle has served the Army well over the last three decades, it was conceived for a different operational environment and enemy than Soldiers now face. Although still highly effective, the Bradley fleet is limited in space, weight, power and cooling capacity and cannot simply integrate many emerging technologies or capabilities.

The capability gaps highlighted the need for increased force protection, survivability, network, mobility and lethality. To address these gaps, the Army developed key minimum attributes that a new Ground Combat Vehicle should possess.

Ideally, the GCV would have Mine-Resistant Ambush Protected Vehicle-like underbelly protection,

Bradley-like cross-country mobility, and Stryker-like urban and operational mobility. It will be the first IFV designed from the ground up to operate across the full spectrum of conflict in an IED environment, and will have the capacity to transport a full nine-man squad. It will also be designed with space for future technologies as they mature.

The Army worked closely with industry experts, think tanks, combat veterans and subject matter experts across a broad range of expertise to determine what the Army should be seeking in the GCV, and what capabilities are possible with current and near-future technologies.

The Army also conducted a detailed analysis to better understand how the vehicle's design features—such as space, weight and power—would influence its capabilities. The service is also evaluating the effectiveness, risk and costs in meeting the proposed requirements for a GCV. ♦

—PEO Ground Combat Systems







## *Infantry brigade combat team modernization*



(Above) Photos, video and text data captured via Increment 1 systems are fed to Soldiers in the Tactical Operations Center during an exercise conducted by the Army Evaluation Task Force at White Sands Missile Range, N.M. The network allows Soldiers to communicate with different units at various levels of command and share information through Network Integration Kits.



(Above) A Soldier equipped with a Common Controller conducts a pre-launch check of a Class 1 UAV. The Common Controller consolidates control of numerous sensor nodes and unmanned systems, including the Class 1 UAV and the Small Unmanned Ground Vehicle, into a single integrated, networked controller.



**C**APABILITY packages are a key element of the Army's infantry brigade combat team modernization strategy, designed to significantly improve the Soldier's knowledge of the battlefield, and the ability to communicate key situational awareness data across the BCT echelon.

Incremental capability packages, developed and fielded on a two-year cycle, will supply the best technology available from the research and development base to meet the challenges of the current fight, while leveraging the continually evolving combat environment and knowledge learned during nine years of war.

Capability packages are composed of vehicles, network elements, equipment and supporting infrastructure to achieve unprecedented joint combat capability in conjunction with the Army Force Generation model. They will include doctrine, organization and training, in conjunction with materiel, to fill the highest priority shortfalls and mitigate risk for Soldiers. The incremental deliveries will build upon one another as the Army continually adapts and modernizes.

Increment 1 forms the backbone of the first capability package, consisting of the Small Unmanned Ground Vehicle, Class 1 Block 0 Unmanned Air Vehicle, Tactical and Urban Unattended Ground Sensors, and the Network Integration Kit, which receives and passes sensor data from the unmanned systems to the Soldier and provides a common operating picture of the battlefield. These technologies work together to move voice, data, images and video across the force in real-time.

(Left) A Soldier with Army Evaluation Task Force prepares to investigate a tunnel with a Small Unmanned Ground Vehicle at White Sands Missile Range, N.M. The tunnel is one element of a vast, operationally relevant test area constructed at the range to test the sensor and unmanned assets that make up Increment 1 of the Army Modernization strategy.



Numerous operational needs statements from theater reflect IBCTs' requirements for additional robotic capability for air and ground, more responsive precision fires at lower levels, and better situational awareness and understanding of friendly and enemy locations in complex terrain. Increment 1 allows the Army to address many of these needs by fielding high-demand, technologically advanced capabilities to Soldiers on the battlefield.

IBCTs are the most often deployed and most vulnerable formations, thereby warranting the increased demand in lower-level unit intelligence, surveillance and reconnaissance. Network connectivity provides the Soldier increased ISR capability, while mounted and dismounted, by enabling effective performance of battle command functions and maximizing Soldier and force lethality and survivability.

Already, leaders of the 3rd Infantry Brigade Combat Team, the first BCT to receive the networked systems, are familiarizing themselves with the key capabilities of the packages. The current modernization strategy will deliver Increment 1 capability to nine IBCTs starting in 2011. ♦



Sgt. Michael Gimble from the 2nd Combined Arms Battalion, Army Evaluation Task Force, places a Tactical Unattended Ground Sensor in the ground during test exercises held at Fort Bliss, Texas, and White Sands Missile Range, N.M. Based on Soldier feedback, the newly designed T-UGS shown here, provides enhanced ranges and capabilities.



Soldiers using a network enabled Shadow UAV, Class 1 UAV and MRAP equipped with a Network Integration Kit conduct a reconnaissance mission at Hal Cox Ranch during the BCT Integration Exercise at White Sands Missile Range, N.M. The NIK provides initial network connectivity to transfer sensor and communication data between Soldiers at every echelon to existing tactical wheeled vehicles.





## Mini robot takes on IEDs



A Marine EOD technician prepares for a mission using the Mini-EOD.

MARINES call it the Devil Pup. The original equipment manufacturer refers to it as the Small Unmanned Ground Vehicle 310; but the official name of this lightweight, transportable robot is the Mini-EOD (Explosive Ordnance Disposal).

The Mini-EOD is specifically designed to locate, identify and disarm explosive and combustible mechanisms to neutralize roadside bombs, car bombs and other improvised explosive devices.

Using rechargeable batteries, the Mini-EOD can travel for 45 minutes at a top speed of 6 mph. It is just more than 2 feet in length and stands less than a foot tall.

The Mini-EOD is composed of a manipulator arm, lights and a chassis with four cameras, allowing a forward- and rear-facing wide field of view. The user wears a monocular over one eye to see what the robot sees and operates the vehicle with a small hand-held device similar to that used in common gaming systems.

Warfighters transport and store the vehicle in a military rucksack, otherwise known as Modular Lightweight Load-carrying Equipment, and operate the device from a wearable Operational Conversion Unit. Together, the vehicle and OCU weigh less than 35 pounds.

The Mini-EOD can navigate over various types of terrain, including rocky, sandy and uneven surfaces, and its low-light capabilities enable it to perform during both day and night-time settings.

The 360-degree pivotal arm is capable of extending 2 feet. It can lift up to 15 pounds close in and 7 pounds at full range.

Since the initial fielding of the Mini-EOD in 2009, more than 200 systems have supported operations in theater. They have kept Soldiers out of harm's way by searching buildings, caves and other high-risk areas. ♦

—Lori Grein/PEO Ground Combat Systems Public Affairs





## *Stryker Double-V Hull addresses Afghanistan challenges*



Army Stryker vehicles of the Stryker Brigade Combat Team kick up plumes of dust during a patrol near Mosul, Iraq, March 31, 2005. These Strykers are from the 2nd Platoon, Bravo Company, 1st Battalion, 5th Infantry, 25th Infantry Division. (Photo by Air Force Tech. Sgt. Mike Buytas)

**T**HE Army is pursuing a new technology to provide the Stryker armored combat vehicle with greater underbelly blast protection against improvised explosive devices. The introduction and development of a revolutionary new Stryker hull design called Stryker Double-V Hull is the Army's response to increased threats in Afghanistan. General Dynamics presented the DVH concept to the Army in January 2010.

Combined with a heavy-duty suspension and improved tires, the DVH design helps channel the effects of underbelly blasts away from Soldiers riding in Strykers—increasing Soldier survivability in the event of an IED strike.

In order to understand what a

double-V hull is, picture a cross section of the hull through the middle of the vehicle that resembles a big “W.” The angles and height of this new hull are designed to provide increased strength and protection to Soldiers in the vehicle, should it absorb an underbelly IED blast.

To get this technology into the fight as rapidly as possible, the Army is executing a very aggressive testing and development plan meant to get a first batch of DVH Strykers into theater as early as this summer, if testing proves successful.

Future Stryker modernization plans include a larger engine and digitization updates that will mitigate the space, weight and power burden, and keep the Stryker formation the most digitally

enhanced formation on the battlefield.

The Stryker is an eight-wheeled combat vehicle that is lighter, smaller and more readily deployable than other combat vehicles. The vehicles are designed in 10 configurations: Infantry Carrier Vehicle, Anti-tank Guided Missile, Mortar Carrier, Command Vehicle, Reconnaissance Vehicle, Engineer Squad Vehicle, Medical Evacuation Vehicle, Fire Support Vehicle, NBC Recon and Mobile Gun System. The Stryker is C-130 transportable, with 14.5 mm basic armor protection. ♦

—PEO Ground Combat Systems





## *JLTV brings capability back to warfighters*

THE Army and Marine Corps' joint light tactical family of vehicles and companion trailers will be able to deliver a balance of protection, payload and performance within a transportable and expeditionary vehicle, meeting the service's rotary- and fixed-wing, air, sea and overland transport requirements—something no existing light tactical wheeled vehicle can do.

The Army and Marine Corps have taken delivery of Technology Development phase vehicles, seven from each

TD phase contractor (BAE Systems, Lockheed Martin and General Tactical Vehicles), marking the beginning of a 12-month test and evaluation effort at Aberdeen Proving Ground, Md., and Yuma Proving Ground, Ariz. Additionally, right-hand operation vehicles were delivered in June and July 2010, and will undergo concurrent testing with the U.S. vehicles, enhancing global interoperability between the U.S. and Australia.

The development of the JLTV reinforces the Army's approach to

interoperable platforms that provide expeditionary and protected maneuver to forces currently supported by Humvees. The intent of the JLTV is to facilitate brigade combat teams' symmetric and asymmetric approaches to tactical and operational maneuvers by improving their versatility and agility. The JLTVs also improve payload efficiency through chassis engineering, enabling the vehicles to deploy with the appropriate amount of force protection through scalable armor solutions. ♦

—PEO Ground Combat Systems

(Background image) The JLTV program is a joint service and international program consisting of a family of vehicles with companion trailers capable of performing multiple mission roles, which are designed to provide protected, sustained, and networked mobility for personnel and payloads across the full range of military operations, traditional to irregular.







## *Thousands of off-road-capable M-ATVs fielded to Afghanistan*



**A**S forces began drawing down in Iraq and the troop surge started in Afghanistan, combatant commanders identified the need to equip Soldiers with an off-road-capable vehicle that had Mine-Resistant, Ambush-Protected vehicle levels of survivability.

Unlike Iraq, which has a mature infrastructure, Afghanistan has very few paved roads, and the rugged mountainous terrain challenges a vehicle's ride quality and off-road mobility. In

response to this requirement, the Pentagon ordered thousands of the MRAP-All Terrain Vehicle, or M-ATV.

Like the baseline MRAPs, thousands of M-ATVs have been procured and are already in the fight. Also like the MRAP, the M-ATV is built with a V-shaped hull, designed to deflect blast debris away from the vehicle while securing Soldiers in an armored protective capsule.

The M-ATV mission is for small-unit combat operations in highly restricted rural, mountain and urban environments to include: mounted patrols, reconnaissance, security,

convoy protection, communications, command and control, and combat service support. It can carry up to five personnel (four plus a gunner). Service-specific variants of the M-ATV have been produced and fielded for the Marine Corps, Navy and Air Force. The Special Forces variant is under testing, and plans are underway to field this version. As of August 2010, more than 4,900 M-ATVs were in the hands of joint warfighters. ♦

—PEO Ground Combat Systems







## *Armor solutions for medium, heavy tactical trucks prove useful*

AS the primary means of transporting warfighters and logistics throughout the theater of operations, tactical wheeled vehicles have been under increasingly destructive and lethal attacks.

At the onset of the current conflicts in Iraq and Afghanistan, the legacy heavy and medium tactical vehicle fleets were not designed to protect Soldiers against the threats they encountered. From rocket-propelled grenades to small-arms fire and improvised explosive devices in the current operating environment, in addition to the threats imposed by asymmetrical warfare, force protection upgrades across the medium and heavy tactical fleets became a top priority.

As an interim solution and in re-

sponse to an Operational Needs Statement, the Army's Product Manager for Medium Tactical Vehicles fielded nearly 1,900 bolt-on Radian Armor Crew Kits for the family of medium tactical vehicles beginning in 2004. The RACK was a fast-fix solution, providing the vehicles with additional ballistic and mine blast protection, but was not intended to serve as a long-term armor solution, because the base cab wasn't manufactured with the ability to accept additional armor. The additional armor placed undue strain on the suspension and vehicle frame, hindering vehicle mobility.

In 2005, a replacement cab—the low signature armored cab—was fielded, which provided 360-degree protection for the FMTV crew while

addressing vehicle reliability concerns associated with adding armor to a “soft-skinned” cab.

At the same time, the Army's Product Manager for Heavy Tactical Vehicles fielded more than 3,100 bolt-on, add-on-armor kits for the Heavy Expanded Mobility Tactical Trucks, Palletized Load System, Line Haul Series, and Heavy Equipment Transport vehicles. More than 1,300 armored HEMTT A4s, 1,100 Line Haul Series, and 750 HET systems have been fielded since 2004.

While AoA kits were fielded to address the immediate need for improved armor protection on the medium and heavy fleets, the Army's long-term armor strategy was underway in an effort to increase crew protection



The Army is working on improvements to the FMTV, including suspension upgrades, electronic stability control, and increased fuel economy.



levels effectively, while eliminating the sacrifice made to vehicle performance. The basic concept behind the LTAS is two essential vehicle configurations: an A-cab, armor-ready vehicle, and a scalable armor B-kit. The A-cab is considered the soft-skinned base vehicle and features built-in mounting provisions for the B-kit and hard to install armor components. The B-kit, which is the armor kit, can be easily mounted onto the vehicle as missions dictate. ♦

—PEO Ground Combat Systems



A Soldier uses a stylus to check a wealth of battle-field information on a Network Integration Kit inside an M-ATV. Fed with sensor data from the field and reports from Soldiers, the NIK enables Soldiers to see first and act decisively.



## *The network: centerpiece of Army modernization*

THE network is the centerpiece of Army modernization efforts. It will provide robust digital connectivity down to the Soldier level, and enable Soldiers to access information at the right place and time to achieve a decisive advantage over any enemy.

Using the network—a layered system of interconnected computers and software, radios and sensors—Soldiers will be able to connect to the proper sensor data and communication relays to ensure battlespace situational awareness. Commanders will be able to fuse data more efficiently, enabling a more accurate understanding of the battlefield and better collaboration to enhance decision making.

The integrated tactical network enables horizontal and vertical communications—voice, data, imagery and video—throughout the brigade combat team formation. It will connect Soldier-leaders to the network through New Equipment Training Team Warrior, and connect the BCT sensor

layer at the company/platoon level via vehicle-based Network Integration Kits. This enhances the company command post—the intersection of all three network layers—allowing for improved communications and robust battle command applications.

Advanced radios and waveforms including the Joint Tactical Radio System Ground Mobile Radio and Handheld Manpack, Soldier Radio Waveform and Wideband Networking Waveform will be used to form the network, allowing data to flow throughout the company and link communications to higher echelons via the Warfighter Information Network-Tactical.

Soldiers will be able to access the Army's Global Enterprise Architecture and distribute critical situational awareness information, both terrestrial and aerial. The mobile, ad-hoc network will increase the speed of maneuver on the battlefield as commanders and Soldiers will no longer need to stop or slow operations to access critical information. The network is designed to be self-

healing to support communications on the move, down to the platoon level and below.

The accelerated network allows the digital distribution of intelligence, surveillance and reconnaissance information; real-time battle tracking; integration of Army attack aviation with ground forces; reach-back into the National Intelligence Database from the company level; digital posting, distribution and archiving of combat reports; and digital medical evacuation requests from Soldiers to higher headquarters.

The Army is in the process of testing the network, which will support the capability package construct as part of BCT modernization. Recently, a BCT integration exercise was conducted to test the development of the network and help the Army continue to formulate its long-term network strategy. ♦

—PEO Command Control Communications-Tactical





## *WIN-T Increment 2 brings on-the-move communications to Soldiers*



FOR the first time, Warfighter Information Network-Tactical Increment 2 will bring mobility to the Army's tactical network down to the company level. It will eliminate the need to stop to communicate, increasing maneuver speed on the battlefield and allowing Soldiers and commanders to stay connected at all times.

WIN-T Increment 2 is the early introduction of mature on-the-move technology. Its mission is to successfully deliver a self-forming, self-healing mobile communication infrastructure to Army combat units down to the company level, giving commanders the ability to communicate seamlessly on the move, and providing a solid foundation of program management and systems engineering for the increments that follow.

A key strength of WIN-T is its ability to adapt to changing battlefield conditions in real time, without the pre-planning and configuration required of traditional enterprise networking infrastructure. It enables network mobility by employing military or commercial satellite connectivity and line-of-sight radios and antennas, to achieve end-to-end connectivity and dynamic networking operations.

Increment 2 maintains a constantly viable self-healing network by providing instant alternate connections in the event its connection is broken. As the vehicles that carry the mobile network move in and out of areas of blockage or



(Top) Chief Warrant Officer 5 Leslie Cornwall, left, and Maj. Marcus Odum from Training and Doctrine Command Capabilities Manager Networks and Services, examine Warfighter Information Network-Tactical equipment during the WIN-T Increment Two Engineering Field Test at Fort Huachuca, Ariz., in December 2008. (Photo by Rich Mattox)

(Bottom) A convoy of future on-the-move platforms for the Warfighter Information Network-Tactical Increment 2, including the two point-of-presence vehicles on the left, during the WIN-T Increment 2 Engineering Field Test at Fort Huachuca, Ariz., in December 2008. (Photo by Rich Mattox)



beyond normal range of connectivity, the network will automatically adapt, allowing for continuous communications between Soldiers.

From division down to battalion, Increment 2 will provide an OTM line-of-sight radio known as the Highband Networking Radio. This new radio will greatly increase line-of-sight capacity and ease of use. With the help of smart multi-beam antenna technology, the HNR can automatically detect all other HNR radios within range and allow users to pass video, voice or Internet Protocol

data traffic to and from each other.

WIN-T Increment 2 completed its limited-user test, which led to a successful Milestone C decision in early February 2010, and award of the low-rate initial production contract. With the initial production funding released, the Program Manager WIN-T has started equipment production for its initial operational test in the first quarter of fiscal year 2012. The first unit equipped is expected by the second quarter of fiscal year 2012.

WIN-T Increment 3, which is still in development, will provide the

air tier, using an advancement of the HNR radio, known as the Joint Command Control Communications and Computers Intelligence, Surveillance and Reconnaissance Radio, or JC4ISR, mounted on unmanned aircraft. The warfighter will possess a three-tiered communication network providing connectivity for the full spectrum of operations. ♦

—Amy Walker/PEO Command Control Communications-Tactical



## *JTRS: The Soldier's networking backbone*

THE Joint Tactical Radio System, or JTRS, is transitioning from research and development, to production and delivery to Soldiers in the field. Providing cyber-hardened Internet Protocol networking on fluid, rough terrain battlefields, JTRS radios seamlessly interconnect air, ground, maritime and space platforms and networks in a multi-band, multi-mode capability to the individual Soldier.

The Soldier's personal C2-on-the-move communications network capability, located in a single box that acts like a mobile cell tower and router, operates in a deployable, mission-programmable, worldwide spectrum. Without JTRS, net-centric warfare, quite literally, stops at the command center. With JTRS products, every warfighter is connected to every other warfighter.

Today's Soldier can look forward to a personal communication support package that is lighter, self-contained, and cannot be hacked; has longer lasting batteries, and is able to transmit and receive at distances previously unimagined in a net-centric capability, at battlefield locations previously unreachable by legacy technologies. JTRS software-defined architecture increases

network security as threats evolve, while providing position location information to the Soldier as real-time situational awareness is passed to the company level and below. Soldiers are safer, smarter and always in touch.

### **A day-in-the life with JTRS**

En-route to a remote security base, your convoy is sidetracked with a vehicle maintenance problem: pulled over in extremely rough mountainous terrain, no sign of civilization in any direction, and the weather is getting worse. The mountains are so high you can only see straight up. Your lieutenant needs to communicate the situation. There are no cell towers, you may or may not have an unmanned aerial vehicle relay overhead, and you wonder if a satellite connection is even available. No satellite, no worry. The convoy does not lose contact with battalion headquarters. JTRS products immediately go to work establishing a communications system and link throughout the entire convoy.

For the first time, the network now moves with the individual Soldier rather than the Soldier having to move with the network. All operational and tactical data are at the Soldier's disposal, not pre-empted or interrupted

by traditional communication limitations. With JTRS, the battlefield is truly networked and every Soldier is connected in a safe, secure communications nerve system where they need it most: at the tactical edge. ♦

—Al Clayton and Mike Daily/Joint PEO JTRS

When equipped with JTRS radios, Soldiers can seamlessly interconnect air, ground, maritime and space platforms and networks in a multi-band, multi-mode capability. (Photo courtesy of General Dynamics)







## *Afghan Mission Network*

**T**HE Afghan Mission Network is filling a void and facilitating communication between the U.S. and key allies in Afghanistan. Until 2010, the 45 coalition nations fighting in Afghanistan were essentially speaking 45 different electronic languages. With each country using its own secure network to transmit critical information, there was no quick and efficient way to share battlefield data across the coalition.

With coalition partners playing a prominent role in Afghanistan, International Security Assistance Force leadership deemed adopting the AMN critical to victory. Using the North Atlantic Treaty Organization ISAF Secret Network as the backbone, the AMN incorporates network extensions from each participating nation. This allows unrestricted data sharing among the

separate existing networks, erasing barriers to situational awareness and communicating the commander's intent.

For the project to succeed, the U.S. piece of the network—Combined Enterprise Regional Information Exchange System-ISAF—needed to become the new home for all mission-critical systems in Afghanistan.

All tactical systems were brought onto the new network. Program Executive Offices Command C3T (Control and Communications-Tactical), Intelligence, Electronic Warfare and Sensors, and elements of U.S. Central Command migrated all appropriate mission-critical United States Command and Control and Intelligence, Surveillance, Reconnaissance systems from the U.S. SIPR network to the CX-I.

A command post of the future allows commanders to see a common

operating picture and to collaborate in real time. The insatiable demand for the full-motion video which is collected by the Persistent Threat Detection System, Unmanned Aircraft System and various Intelligence, Surveillance, and Reconnaissance platforms will now be at the fingertips of coalition forces with feeds from as well as information available through the Distributed Common Ground System-Army.

The network, fielded on a tight timeline, was equipped with the technology by March 2010, about four weeks after ISAF leadership's directive. The initial plan—to procure a new set of equipment for use on the U.S. component of the AMN—could have dramatically slowed the process. But PEOs C3T, IEW&S and the CENTCOM elements involved shifted strategies, opting instead to reconfigure existing





(Right) Chief Warrant Officer 4 Patrick Quenga, network security engineer and information assurance officer for the Joint Network Control Center-Afghanistan, remotely monitors Host Based Security System activity on MC4 systems operating on the Afghanistan enterprise network.

(Bottom) Sgt. Darrell W. Coffman, Company C, Headquarters and Headquarters Battalion, VSAT facility noncommissioned officer in charge, top, and Sgt. William M. Hemingway, Company C, HHB, 101st Airborne Division, TT (traffic terminal) and SPOP (SiPR point of presence) and reset technician, troubleshoot a problem with an SPOP, Sept. 7. The SPOP is part of the system that enables computer-network communication between coalition forces in Afghanistan. (Photo by Sgt. Grant Matthes)



equipment where possible. That saved more than \$10.7 million in equipping the 2SCR, and total savings on CX-I are projected at nearly \$59 million.

The urgency also meant units were trained on the new network in the U.S. before deploying, ensuring they were prepared to operate the technology when they arrived in theater. ❖

—Claire Heininger/PEO Command Control Communications-Tactical







## Brigade Combat Team Integration Exercise



Video feeds are received in a command post in Aberdeen Proving Ground, Md., from White Sands Missile Range, N.M., at the Brigade Combat Team Integration Exercise, July 15.

**D**URING the Brigade Combat Team Integration Exercise—a demonstration that took place in July 2010 at White Sands Missile Range, N.M., and Aberdeen Proving Ground, Md.—a team of Soldiers, engineers and Army senior leaders experienced the future of the integrated network. In particular, they actualized the concept of using unmanned aircraft and integrated Soldier Network Extensions to connect Soldiers at all echelons of the brigade combat team.

Using White Sands as a stand-in for the harsh terrain of Afghanistan, the Army Evaluation Task Force navigated improvised explosive device routes, executed air assaults and simulated a variety of other missions.

Scattered throughout the far-flung mountains and deserts of Afghanistan, Soldiers are increasingly reliant upon the Army's tactical network to gain a decisive edge over the enemy.

Fortunately, the network is getting smarter.

With a Rifleman Radio attached

to each of its wingtips, the Shadow unmanned aircraft system—which can fly for six hours and reach a ceiling of nearly 15,000 feet—allowed two Rifleman Radio networks on the ground to communicate beyond line of sight. That meant individual Soldiers in separate companies could successfully pass messages without seeing one another—something that's currently not possible below the battalion level.

For the first time, three separate waveforms were integrated, connecting the lowest to the highest echelons. They included the Soldier Radio Waveform, used by individual Soldiers or teams within a company; the Wideband Network Waveform, used to share tactical data at higher echelons; and the Network Centric Waveform, a satellite layer.

At White Sands, the Soldiers within a company could seamlessly communicate with their own platoons and even with other Soldiers at the battalion level. Inside their command posts, company commanders

exchanged text messages and e-mails, tracked simulated IEDs, collaborated on the battle with Command Post of the Future, and planned fires with the Advanced Field Artillery Tactical Data System. They tracked automatically populated friendly forces' movements and manually added enemy and hazard locations with Force XXI Battle Command, Brigade-and-Below, or FBCB2.

The BCTIE is expected to be the first of several exercises as technology continues to evolve. ♦

—Claire Heiningner/PEO Command Control Communications-Tactical



A Shadow UAV is launched from Condon Field, N.M. The Shadow is equipped with various camera systems to provide tactical intelligence, and a set of radios to help extend the wireless networks range in rough terrain. (U.S. Army Photo)





## ***TOW: Combat-proven weapon of choice***

ORIGINALLY intended as an anti-tank weapon, the Tube-launched, Optically-tracked, Wire-guided missile remains an extremely effective weapon system.

In the last seven years of conflict, the Army has fired more than 7,600 missiles in support of operations in Iraq and Afghanistan. The TOW's precision and effectiveness with minimum collateral damage make it particularly suitable for the non-tank targets of current theater environments.

The Improved Target Acquisition System is the latest fire control system for the TOW and consists of integrated optical forward-looking infrared sights and an eye-safe laser range finder. A recent upgrade to ITAS is the far target location capability, which allows gunners to accurately determine the position of enemy threats well beyond traditional engagement ranges.

The system's FTL incorporates a global positioning satellite-based Position Attitude Determination System. The addition of the PADS to the TOW ITAS system provides the Soldier an instant grid location of his position and the target he sees in his ITAS sight. The new capability improves the Soldier's situational awareness, while giving the ground commander the option either to destroy a wide array of target sets with a missile, or direct other assets (such as close air support or indirect artillery fire) against threats.

Current TOW missile improvements include a Bunker Buster variant and replacement of the obsolete wire guidance link with one that operates via radio frequency. The new TOW BB, which is just entering the Army and Marine Corps inventories, is optimized for precision assault capabilities that better suit the target set in Afghanistan than the original anti-tank rounds.

While unavailability of wire drove the development of RF, modest improvements included the elimination of overwater and power line restrictions, enhanced combined-arms applications

in urban environments and greater environmental compliance under training conditions.

Recent feedback from theater indicates that the TOW weapon system made a difference across the entire area of operation. Insurgents gave TOW ITAS the code name The Finger of God, for its imposing ability to not only locate the enemy, but to reach out and destroy them. ♦

*—Maj. James Stepien/PEO Missiles and Space*





# Insignia of the United States Armed Forces — OFFICERS

0-1	0-2	0-3	0-4	0-5	0-6	0-7	0-8	0-9	0-10	Special
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## ARMY • AIR FORCE • MARINES

Second Lieutenant (2LT)	First Lieutenant (1LT)	Captain (CPT)	Major (MAJ)	Lieutenant Colonel (LTC)	Colonel (COL)	Brigadier General (BG)	Major General (MG)	Lieutenant General (LTG)	General (GEN)	General of the Army (GA)

## NAVY • COAST GUARD

Ensign (ENS)	Lieutenant Junior Grade (LTJG)	Lieutenant (LT)	Lieutenant Commander (LCDR)	Commander (CDR)	Captain (CAPT)	Rear Admiral Lower Half (RADM)(L)	Rear Admiral Upper Half (RADM)(U)	Vice Admiral (VADM)	Admiral (ADM)	Fleet Admiral (FADM)

W-1	W-2	W-3	W-4	W-5
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## ARMY

Warrant Officer (WO1)	Chief Warrant Officer (CW2)	Chief Warrant Officer (CW3)	Chief Warrant Officer (CW4)	Chief Warrant Officer (CW5)

## NAVY • COAST GUARD

Chief Warrant Officer (CW01)	Chief Warrant Officer (CW02)	Chief Warrant Officer (CW03)	Chief Warrant Officer (CW04)	Chief Warrant Officer (CW05)
NO WARRANT OFFICER USCG				NO WARRANT OFFICER USCG

## MARINES

Warrant Officer (WO)	Chief Warrant Officer (CW02)	Chief Warrant Officer (CW03)	Chief Warrant Officer (CW04)	Chief Warrant Officer (CW05)

## AIR FORCE

NO WARRANT	NO WARRANT	NO WARRANT	NO WARRANT	NO WARRANT
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# Insignia of the United States Armed Forces — ENLISTED

E-1	E-2	E-3	E-4	E-5	E-6	E-7	E-8	E-9	Senior Enlisted Advisors
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## ARMY

no insignia											
Private E-1 (PV1)	Private E-2 (PV2)	Private First Class (PFC)	Specialist (SPC)	Sergeant (SGT)	Staff Sergeant (SSG)	Sergeant First Class (SFC)	Master Sergeant (MSG)	First Sergeant (1SG)	Sergeant Major (SGM)	Command Sergeant Major (CSM)	Sergeant Major of the Army (SMA)

## MARINES

no insignia											
Private (Pvt)	Private First Class (PFC)	Lance Corporal (LCpl)	Corporal (Cpl)	Sergeant (Sgt)	Staff Sergeant (SSgt)	Gunnery Sergeant (GySgt)	Master Sergeant (MSgt)	First Sergeant (1stSgt)	Master Gunnery Sergeant (MGySgt)	Sergeant Major (SgtMaj)	Sergeant Major of the Marine Corps (SgtMajMC)

## AIR FORCE

no insignia													
Airman Basic (AB)	Airman (Amn)	Airman First Class (A1C)	Senior Airman (SrA)	Staff Sergeant (SSgt)	Technical Sergeant (TSgt)	Master Sergeant (MSgt)	First Sergeant (E-7)	Senior Master Sergeant (SMSgt)	First Sergeant (E-8)	Chief Master Sergeant (CMSgt)	First Sergeant (E-9)	Command Chief Master Sergeant (CCM Sgt)	Chief Master Sergeant of the Air Force (CMSAF)

## NAVY

no insignia										
Seaman Recruit (SR)	Seaman Apprentice (SA)	Seaman (SN)	Petty Officer Third Class (PO3)	Petty Officer Second Class (PO2)	Petty Officer First Class (PO1)	Chief Petty Officer (CPO)	Senior Chief Petty Officer (SCPO)	Master Chief Petty Officer (MCPO)	Force or Fleet Command Master Chief Petty Officer (FORMC) (FLTMC)	Master Chief Petty Officer of the Navy (MCPON)

## COAST GUARD

Seaman Recruit (SR)	Seaman Apprentice (SA)	Seaman (SN)	Petty Officer Third Class (PO3)	Petty Officer Second Class (PO2)	Petty Officer First Class (PO1)	Chief Petty Officer (CPO)	Senior Chief Petty Officer (SCPO)	Master Chief Petty Officer (MCPO)	Command Master Chief (CMC)	Master Chief Petty Officer of the Coast Guard (MCPO-CG)



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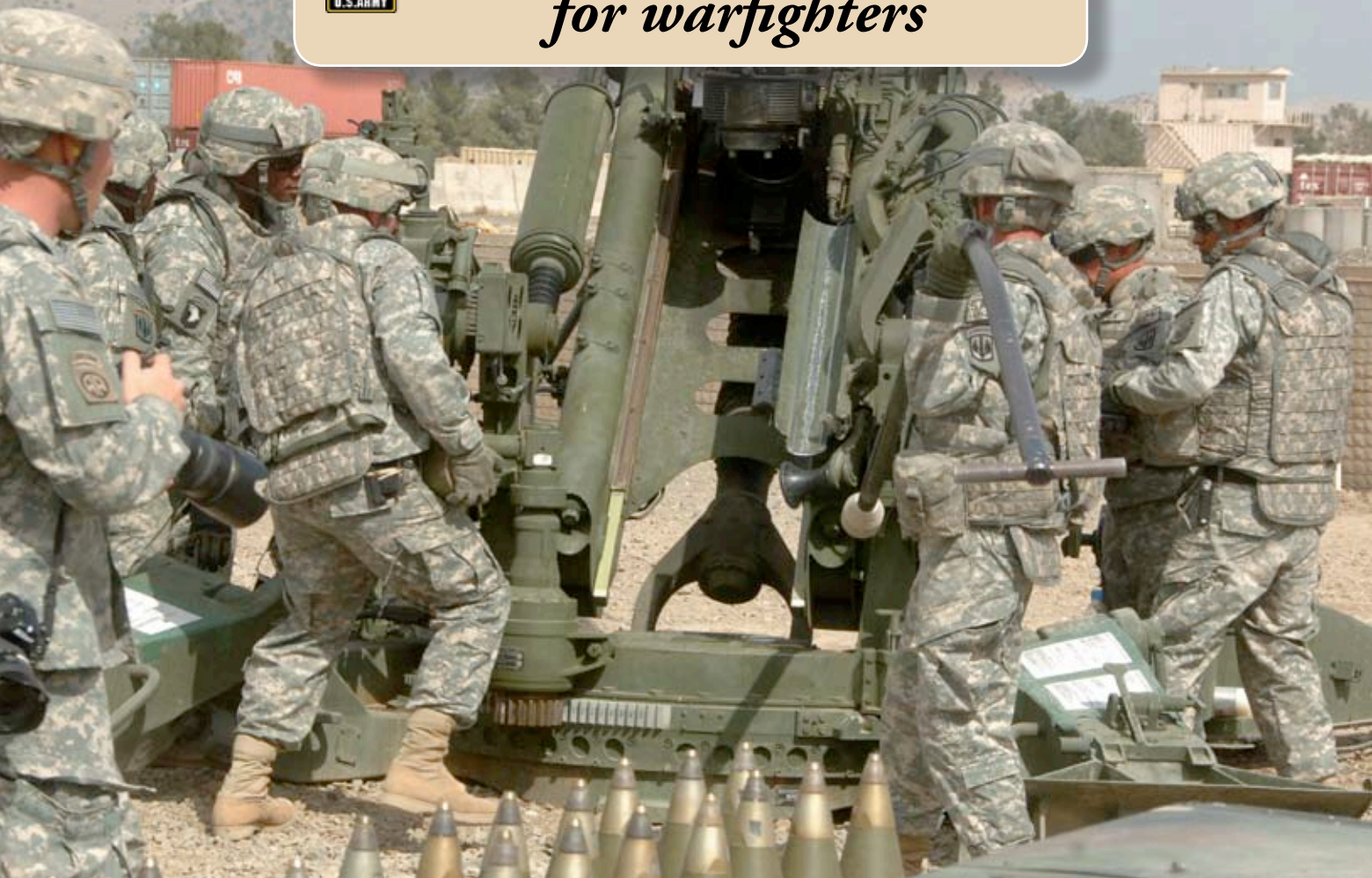


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## *Excalibur: Precision for warfighters*



Soldiers of 321st Field Artillery, 4th Brigade, 82nd Airborne Division, test fire the Excalibur artillery round on Forward Operating Base Salerno, Afghanistan, Feb. 28, 2008. (Photo by Sgt. Nicholas Williams)

THE M982 Excalibur artillery projectile provides Soldiers and Marines with a tool they need to succeed in a modern warfighting environment. It has all-weather availability, a range of 40 kilometers, accuracy of 6 meters or better, and has demonstrated performance in successful engagements in Iraq and Afghanistan. The Excalibur is the only precision weapon organic to the brigade combat team.

The Excalibur is a 155 mm, precision-guided, extended-range artillery projectile designed to engage targets precisely with minimal collateral damage. The projectile's fuse can function in one of three modes: height of burst, point-detonate or point-detonate with delay. It can be fired from either the

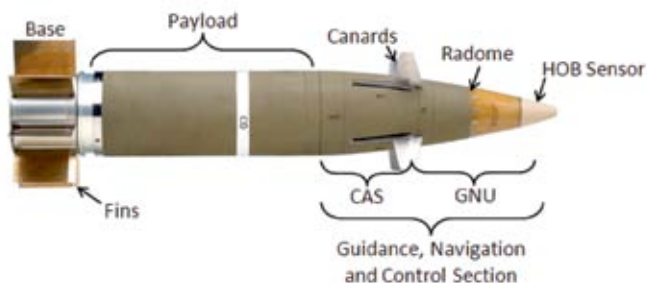
M777A2 Joint Lightweight Howitzer or the M109A6 Paladin Self-Propelled Howitzer.

Excalibur's major advantages lie in its accuracy, low collateral damage, high reliability, all-weather capability and responsiveness. It has been used successfully in 182 missions in U.S.,

as well as Canadian and Australian, theaters.

The Excalibur is completing its final approvals to go into full production in the second quarter, fiscal year 2011. ♦

—PM Combat Ammunitions Systems







## *Javelin and CCWS: Responding to change*



Soldiers fire a Javelin medium anti-tank missile during deployment training.

A Javelin missile strikes a derelict M60 tank during a demonstration, at the Joint Multinational Training Center in Grafenwoehr, Germany. (Photo by Gary I. Kieffer)

**T**HE Javelin began as a man-portable, anti-armor missile in 1985, and continues to evolve. There have been major upgrades to the Command Launch Unit, featuring greater magnification, increased surveillance time, and increased identification range. There have also been improvements to the missile, resulting in significantly reduced time of flight and increased kinematic range.

As the Javelin continues to evolve, it is essential to maintain awareness of specific user requirements to ensure that the system evolves effectively.

The Army is currently funding a major improvement program for Javelin. One of these improvements, the multi-purpose warhead, is relevant to the fight in Operation Enduring Freedom. The MPWH employs a frag-

menting case that increases the missile's effectiveness against non-armor targets such as personnel and light vehicles, while still meeting lethality requirements against armor.

Other improvements include precision terminal guidance, a new seeker, and a new guidance electronics unit. These improvements will further increase the range and performance of the system and mitigate obsolescence issues.

The requirements of today's dismounted infantry warfighter are constantly changing, and communication between developers and Soldiers is key to successfully adapting the Javelin to meet those requirements. The Close Combat Weapon Systems Project Management Office has created a Warfighter Communications Campaign,

featuring a Javelin website at Army Knowledge Online.

The purpose of this initiative is to gather direct feedback from Soldiers who have used Javelin in theater. After-action review sessions are conducted with units redeploying from Iraq and Afghanistan to collect tactics, techniques and procedures with regard to use of the weapon system. Engagement information, success stories and suggestions for improvement are communicated throughout the different functional areas of the CCWS PMO, including engineering, logistics and training.

For more information, or to provide user feedback, visit <https://www.us.army.mil/suite/page/617203>. ♦

—Close Combat Weapons Systems Project Office





## Mortar systems for the 21st century



M326 Mortar Stowage Kit and M150 Mortar Fire Control System-Dismounted. (Right) XM395 Accelerated Precision Mortar Initiative.

ARMY commanders have long relied on their organic mortar systems to provide rapid and accurate fires. They own their mortars and understand their basic capabilities for providing responsive suppression, illumination and obscuration—and these characteristics are about to improve in a big way.

The biggest changes are taking place with 120 mm mortar systems in the infantry brigade combat team. Units are now receiving the M150/M151 Mortar Fire Control System-Dismounted, and the M326 Mortar Stowage Kit. The MFCS-D provides digital fire control that greatly increases both accuracy and responsiveness. The M326 provides a powered assist in rapidly emplacing and displacing the complete M120 mortar system (tube, baseplate, bipod and fire control) from the M1101 trailer.

With these enhancements, the IBCT mortar platoon now has shoot and scoot capabilities, allowing them to set up and fire accurately within 90 seconds of receipt of fire mission while on the move. After firing, the mortar can be displaced, stowed and ready for road march within two minutes.

The next advancement for the 120 mm mortar will be the XM395

cartridge, commonly known as the Accelerated Precision Mortar Initiative. Developed in response to an operational needs statement from forces deployed to Operation Enduring Freedom, the XM395 is a Global Positioning System-guided, 120 mm mortar cartridge.

Plans call for the new cartridge to be fielded to Afghanistan in 2011. Once fielded, it will reduce the risk of collateral damage by increasing accuracy to a 10-meter circle of equal probability or less. At maximum range this represents an estimated seven-fold improvement over the accuracy of the existing M934A1 round.

Enhancements to the lighter mortar systems (M224 60 mm and M252 81 mm) are mainly focused on weight reduction to reduce the Soldier's burden. All current capabilities for rate of fire and range will be maintained, but the new tubes, baseplates and bipods have been designed to reduce the weight of the 60 mm system from 46.5 to 35.1 pounds, and the 81 mm system from 93 to 72 pounds. These new weapons are scheduled to begin replacing the currently fielded 60 mm and 81 mm mortar systems this year. ♦

—PM Close Combat Systems







## *Precision Guidance Kit increases artillery accuracy*



PGK illustration: XM1156 Precision Guidance Kit atop M107, M795 and M549A1 high-explosive projectiles.

ARMY artillerymen will soon have a new weapon that will allow them to provide more accurate fires.

The XM1156 Precision Guidance Kit, or PGK, is a global positioning system guidance kit with fusing functions, scheduled for fielding this year. It will improve the accuracy of the current stockpile of 155mm High Explosive M107, M795 and M549A1 projectiles.

Once fielded, the near precision PGK will increase the accuracy of these HE projectiles. Increased accuracy will mean increasing the efficiency of the existing 155mm HE stockpile, requiring fewer rounds to ensure the desired results. This has the potential to reduce the logistics burden of shipping and storing projectiles and propellant charges by an estimated 75 percent.

The PGK is compatible with the M109A6 Paladin and M777A2 light-weight towed howitzer. It is set with

the same enhanced portable inductive artillery fuse setter currently in use with the M982 Excalibur round and the M782 multi-option fuse for artillery. Once fired, the PGK uses GPS satellite information to make small adjustments to its flight path and steer the projectile to the identified target location, thus improving the effectiveness of each round fired. When the XM1156 is fielded, it will supplement (but not replace) the precision capabilities provided by the much more accurate Excalibur.

The precision guidance kit has the potential to support warfighters by offering a flexible capability when accuracy and collateral damage are of concern. The improved accuracy maximizes the effectiveness of these munitions and significantly reduces the

logistics burden while achieving the same effects.

PGK does not change the target sets associated with HE projectiles, but does change some of the conditions and considerations for tactical employment of the HE/PGK combination. Efforts are already underway to develop newer versions compatible with 105 mm projectiles with even better accuracy. ♦

—PM Combat Ammunitions Systems





## *Value of intelligence expanded by DCGS-A*



The Distributed Common Ground System-Army serves as a dedicated avenue for ingesting, fusing, analyzing and disseminating information throughout the Army and associated defense agencies.

GATHERING information on the battlefield presents challenges for Soldiers and commanders. Pulling together multiple sources of information to develop a complete understanding of the battlefield, as well as providing an enterprise where collected information is of value to any Soldier (regardless of the echelon they operate within) can be difficult. The Distributed Common Ground System-Army has proven itself worthy of these tasks, under the duress of battle in Iraq and Afghanistan.

DCGS-A is designed as a dedicated avenue for ingesting, fusing, analyzing and disseminating information throughout the Army and associated defense agencies. The system replaces nine families of systems that had previously operated as stand-alone systems, providing signals intelligence, image intelligence, terrain, weather and moving target indicator information. Enabling these stand-alone systems to work together in a unified DCGS-A environ-

ment has presented unique challenges, which the program has worked through over the years, with the final solution of the DCGS-A Mobile Basic in sight.

DCGS-A is drastically changing the basic premise of how intelligence is collected and shared. Traditionally, intelligence has been looked at as an echelon asset. (The level a person operated within directly correlated with the information available to him.) DCGS-A allows units to move away from the echelon approach and into an enterprise solution.

The value and reliance on the intelligence DCGS-A currently provides extends beyond just Army and sister service users. When "the brain" (a data warehouse) was initially stood up, it was getting 10,000 to 20,000 queries a month, mostly from Army users. The number of requests has steadily increased to close to 250,000 hits a month, with the majority of requests coming from the other services and three-letter agencies.

Currently 90 percent of the force is fielded with DCGS-A V3 systems, and DCGS-A products will be more accessible in the near future, not only for American users, but also for coalition partners in Afghanistan. During this fiscal year, a DCGS-A capability will be migrating into the U.S. Combined Enterprise Regional Information Exchange and the Afghan Mission Network, establishing a two-way ability to push data to coalition partners and pull data from coalition systems.

The combination of technological enhancements, along with the out-of-the-box thinking that Soldier users bring to the intelligence enterprise, will continue to ensure that the variations of how DCGS-A can be used in the future are virtually limitless. ♦

—Brandon Pollachek/PEO Intelligence,  
Electronic Warfare and Sensors Public Affairs





## One System Remote Video Terminal

THE One System Remote Video Terminal was born from an need for tactical commanders to leverage data collected from Unmanned Aircraft System and increase situational awareness on the battlefield. The UAS Common Systems Integration Product Office received that message, and in a few years, has coordinated the delivery of 2,500 OSRVTs, fielding more than 1,775 systems to theater.

The OSRVT is mobile, but also includes a tactical operations center configuration. The system consists of a laptop, multi-band receiver, UHF

modem, antennas, cables, software and a Mobile Directional Antenna System. The MDAS is an extended-range antenna system for fixed- and semi-fixed TOC configurations. Two Soldiers can emplace and displace the OSRVT with MDAS in one hour. The OSRVT provides Soldiers with a real-time video feed from nearby UAS systems.

The OSRVT can be used in a stand-alone configuration, but is also being integrated into other platforms. Currently it has been integrated into the Apache Longbow (AH-64D) and Stryker combat vehicle, with ongoing work to integrate the system into other platforms such as the MRAP, OH-58, and UH-60. In 2010, a HH-60 MEDEVAC helicopter successfully participated in an OSRVT demonstration.

The OSRVT receives video and imagery data from numerous Department of Defense manned and unmanned platforms. Improvements are ongoing, and testing is underway with the ROVER 6, which will replace the existing ROVER 4 multiband receiver in the OSRVT. The Army is also working software upgrades that provide the OSRVT the ability to receive encrypted signals and digital video links from UASs.

Additionally, a team at Fort Rucker, Ala., recently conducted a user assessment of the OSRVT. This assessment supports the Army's efforts to fine-tune both functionality and ergonomics associated with allowing an OSRVT user to assume control of the UAS payloads. This bi-directional functionality of the OSRVT is the newest feature of the OSRVT program. ♦

—PM Command, Control, Communications, Computers, Surveillance and Reconnaissance On-the-Move







## Connecting Soldiers to Digital Applications

### A convenient, flexible approach

**W**HETHER you're tech savvy or not, you will like what Connecting Soldiers to Digital Applications can do for you. The CSDA concept is to explore and leverage potential smart phone technologies to support and access Army functions in a portable, hand-held device.

CSDA's goal is to enhance Soldiers' efficiency and effectiveness with emerging technologies and capabilities in a time- and cost-saving manner.

Several pilot projects are exploring the value of providing Soldiers digital applications on smart phones for education, training, administrative functions, leadership development and operational support. These digital applications offer a convenient and flexible approach to training and information access, which helps foster a persistent learning environment.

For example, Soldiers will be able to use apps for a variety of training functions, including self-paced individual training, foreign language education and translation, and distance learning. They will also perform administrative functions, like issuing and storing temporary duty and permanent change of station orders, scheduling medical and dental appointments, and preparing for promotion boards.

The Army is actively generating smart phone training applications focused on priority needs. In spring 2010 CSDA's complimentary program, Apps for the Army, leveraged the Army's own talent to develop applications for Soldiers. Many of these applications will be incorporated into CSDA.

The Army is also exploring the use of smart phone technologies for opera-

tional and tactical functions. Possible capabilities include digital mapping and communication applications with which Soldiers will be able to locate landmarks, relay information on enemy or friendly locations and pinpoint injured Soldiers' locations to quickly send help.

So, is it Droid, iPhone or Palm Treo? In the summer of 2010, 200 phones were issued to Soldiers from the 5th Brigade, 1st Armored Division, at



Fort Bliss, Texas, to test and evaluate the effectiveness of the phone brands in support of military functional tasks. The Soldiers chose and loaded applications useful to them from the Army's Apps Store. A tracking system allowed them to assess and share their evaluation, engage in dialogue and exchange feedback. At the end of the testing period, the data will be captured, reviewed and assessed to determine which of these commercially developed phones is most suited for the Army. ♦

—Annie Gammell/Future Force Integration Directorate Public Affairs

### Apps for the Army

**A**PPS for the Army, or A4A, the Army's first internal application development challenge, launched March 1, 2010. In 75 days, 141 Soldiers and Army civilians registered in teams or as individuals to participate in the A4A challenge. By the May 15 deadline, Soldiers and civilians from all three Army components had developed and submitted 53 Web and mobile applications.

The A4A pilot program shifted from traditional Army development practices by using the latest in agile development methods, all the while focusing on rapid deployment. A4A is part of the Army's larger effort to make it easier to develop apps and certify and deliver software.

The Army provided application development teams with key resources such as a multi-platform, cloud-based, secure development environment. The forge.mil development site served as the collaborative software repository for participating teams.

Fifteen winners and 10 honorable mentions were selected in June. Each of the five categories had first (\$3,000), second (\$1,500), and third place (\$1,000) winners, as well as honorable mentions. Each application helps address mission-related challenges. Winners are listed at <http://ciog6.army.mil/Apps4Army.aspx>. Winning apps are available at the Army Application Marketplace: <https://storefront.mil/army/>. For desktop access, a DOD Common Access Card is needed. Users browsing from their iPhone and Android Smartphones do not need a CAC. ♦





## *New camo enhances Soldiers' capabilities*

Staff Sgt. Gary A. Witte



Spc. Jesus B. Fernandez, wearing the OEF Camouflage Pattern on his uniform, crosses a stream during a unit visit to Angla Kala village in Afghanistan's Kunar province, Feb. 6, 2010. Soldiers going to Afghanistan will now be issued the new OCP Fire Resistant Army Combat Uniform.



**A**UGUST 10, 2010, Soldiers deploying to Afghanistan became the first to be issued uniforms in the newly designed Operation Enduring Freedom Camouflage Pattern, or OCP.

The decision to develop and field an alternative camouflage for uniforms came out of a recognition that in Afghanistan, Soldiers on a single patrol can potentially go from desert conditions to wooded areas, villages and rocky mountain environments. The current Universal Camouflage Pattern, or UCP, did not meet all of the concealment needs for Afghanistan's varied terrain.

When conceiving a new camouflage color palette, Program Executive Office Soldier—responsible for developing and testing the new uniform—wanted to ensure Soldiers have a combat edge in every possible terrain. Similar to the Battle Dress

Uniform woodland print, the OCP is a combination of seven shades of greens, browns and beiges that presents a concealment solution to Afghanistan's multiple-terrain challenge. Extensive testing has demonstrated that in varied environments, the OCP shields wearers from detection 20 percent more effectively than the UCP.

Making Soldiers blend with their environment is not the only protection the OCP offers. It is also fire-resistant and protects Soldiers from insect-borne diseases, such as malaria, Lyme disease and leishmaniasis. The OCP stood up to flash flames at a burn center in San Antonio, Texas, well enough to almost entirely prevent third-degree burns. The clothing has also been chemically treated to make Soldiers less appealing to mosquitoes.

While cut in the same style as the ACU, the OCP—the result of months of rigorous testing and critical Soldier

feedback—will have several upgrades including a reinforced seat, buttons on the trouser cargo pockets, and buttons to replace the Velcro on other pockets. New Mountain Combat Boots featuring a tougher, more durable sole for gripping mountainous terrain, will also be issued to deploying Soldiers.

In collaboration with the U.S. Army Infantry Center, Natick Labs, the Asymmetric Warfare Group, Army Special Operations Command and the U.S. Naval Research Center, PEO Soldier conducted a nearly yearlong study of options for the new camouflage, which included travel throughout Afghanistan to gather data on different proposed patterns and Soldier input on the patterns' detectability and blendability. ♦

—PEO Soldier





## New weapons: lighter, better

Courtesy of PEO Soldier



The XM806 Lightweight .50 Caliber Machine Gun is a lightweight variant of the Enhanced .50-Caliber Machine Gun. The major benefits of the XM806 are its low weight and recoil, as well as improved reliability, manual safety, extended barrel life and quick-change barrel.

**F**OR years, the Army has been addressing Soldier load using both materiel and non-materiel approaches.

For its part, Program Executive Office Soldier's Project Manager Soldier Weapons division continues to make progress on lightening the load through its individual and crew-served weapons programs. This initiative is vital for both the survivability and lethality of Soldiers on the battlefield. While some weight savings have been in place for years, PM Soldier Weapons continues to progress in this critical area of Soldier support.

**M4 Carbine:** The M4 is a shorter version of the M16 rifle designed for lightness, speed and mobility. Compared to the M16, the M4 reduces the Soldier's load by 1.4 pounds.

**M26 12-Gauge Modular Accessory Shotgun System:** The lightweight MASS can mount to the M4 Carbine, adding the capability of a separate shotgun without the need to carry a separate weapon. Compared to the M500, the M26 reduces a Soldier's load by 2.2 to 4.2 pounds, depending on the configuration.

**M240L 7.62mm Medium Ma-**

**chine Gun (Light):** The new M240L incorporates titanium construction and alternative manufacturing methods while delivering outstanding reliability and performance numbers. Compared to the M240B, the M240L reduces the Soldier's load by 5 pounds.

**XM806 Lightweight .50 Caliber Machine Gun:** Currently in development, the 45-pound XM806 weighs roughly half as much as the M2 .50-caliber machine gun, while reducing the recoil by at least 60 percent. Compared to a similarly configured M2 and tripod, the XM806 will reduce a Soldier's load by more than 50 pounds.



(Inset) The M4 is a lighter version of the M16 rifle. It also allows mounting of the latest generation of fire control accessories without tools. (Photo courtesy of PEO Soldier)

### Improved Machine Gun Tripods

**Systems:** The M192 Lightweight Ground Mount features a lower profile and weighs approximately 6 pounds less than the M122A1 Tripod it replaced. The XM205 Lightweight Heavy Machine Gun Tripod is currently in development and is intended for the dismounted M2 and MK19. The final weight upon production will be at least 30 percent less than the current 44-pound M3 tripod.

Collectively, the weight savings gained in Soldier weapons constitute a significant achievement, but more savings lie on the horizon. Joint efforts through the Lightweight Small Arms Technologies program are working to reduce the weight of weapons and ammunition by as much as 50 percent. LSAT projects include new weapon systems that fire cased and caseless telescoped ammunition. With continuing advances in material science and engineering, the future is both bright and light. ♦

—PEO Soldier's Project Manager Soldier Weapons





## *Lighten up: new tactical vest*

**T**HE Army's Program Executive Office Soldier places an emphasis on lightening the Soldier's load by reducing the weight of required equipment, both to enhance mission effectiveness and, most important, to improve Soldier survivability.

The Improved Outer Tactical Vest is the latest advancement in body armor and is more than three pounds lighter than its predecessor, the Outer Tactical Vest. It provides protection from fragments and 9 mm rounds.

The IOTV consists of a groin protector, back yoke and collar, front yoke and collar, lower back protector and deltoid protector. The IOTV incorporates a quick release for emergency doffing. In 2010, the IOTV underwent more than a dozen enhancements to improve form, fit and function.

The new Soldier Plate Carrier System, or SPCS, is a lighter-weight form of body armor designed to be used in designated missions in Operation Enduring Freedom that require greater mobility. It provides ballistic protection equal to or greater than that of the IOTV in a stand-alone capacity, while reducing the Soldier's load, enhancing comfort, and optimizing mobility and maneuverability. The SPCS gives commanders more choices in how to carry out their missions while giving Soldiers greater flexibility to operate in demanding terrain.

The SPCS reduces the weight of fully equipped body armor by just more than 9 pounds. It weighs 5.85 pounds in size medium without ballistic plates, and 21.85 pounds in size medium with ballistic plates.

The SPCS vest carries standard hard armor plates for vital ballistic protection, but covers less of the Soldier's body than the Interceptor Body Armor system. This allows the Soldier to carry less weight while maintaining an equal



Interceptor Body Armor is a modular system that consists of an outer vest, ballistic plates and attachments that increase the area of coverage. IBA increases survivability by stopping or slowing bullets and fragments and by reducing the number and severity of wounds.

amount of protection.

The lightweight SPCS vest features adjustable shoulder and side straps to ensure proper fit and keep the vest in place with minimal shifting during wear. Other features include padded shoulders, cable release, wrap-to-front design for a secure fit with easy donning, man-down drag strap, wire channel buttonholes, and modular lightweight load-carrying

equipment webbing for securing mission-essential equipment.

The SPCS is compatible with essential equipment including M4/M16 magazines, a hydration system, squad radio and night vision equipment, as well as comfortable, secure and balanced wear of a day pack or rucksack. ♦

—PEO Soldier





## Engagement Skills Trainer 2000



Doug Schaub

PEO STRI oversees the production, fielding and sustainment of the Engagement Skills Trainer 2000. The EST 2000 enables Soldiers to go through initial and sustainment marksmanship training, along with collective gunnery and tactical instruction.

**A**LL Soldiers train on the Engagement Skills Trainer 2000 before they ever fire a live round. The life-sized, life-like simulator provides marksmanship training to Soldiers through hundreds of interactive vignettes, ranging from military police procedures to maritime force protection scenarios and full-on combat operations.

The EST 2000, a virtual marksmanship trainer, provides a critical capability for leaders to train Soldiers. The training device provides Soldiers the opportunity to learn what's right, make mistakes and learn from their mistakes. Leaders can also measure performance, and then work on areas that need focus.

The EST 2000 provides safe and cost-effective training. And while the Army has avoided millions of dollars in costs through its use of the EST 2000, the true value of virtual marksmanship is that it allows a Soldier to conduct training leading to weapon proficiency, combat effectiveness and ultimately, survivability on the modern battlefield. A high percentage of Soldiers who train using a virtual marksmanship trainer will qualify the first time they go to a live-fire range.

In 2001, Program Executive Office-Simulation, Training and Instrumentation started providing marksmanship training via the EST 2000 and the program quickly gained momentum. Then in 2006, the Army recognized the

importance and effectiveness of this training program and the EST 2000 became a critical part of the Army's marksmanship training strategy, such that Soldiers spend at least eight hours training on this virtual device before they undergo live gunnery training.

Today, more than 750 EST 2000s are training Soldiers across the globe, including those in combat zones. The EST 2000 also trains law enforcement officials and allied armies. ♦

—PEO for Simulation, Training & Instrumentation





## *Look, up in the sky... ...it's the Gray Eagle*



An MQ-1C Gray Eagle flies over the skies at El Mirage, California. A small group of QRC-2 Soldiers recently deployed, becoming the first unit to do so with the armed version of the Gray Eagle. The QRC-2 version includes Hellfire missiles as well as satellite communications data link capabilities.

**T**HE Army is continuing production of the Gray Eagle Extended Range/Multi-Purpose Unmanned Aircraft System with the first unit to be equipped in fiscal year 2011.

In support of a secretary of defense directive to surge forces to theater, the UAS Project Office developed a Quick Reaction Capability to get Gray Eagle into the fight more quickly. QRC-1 was fielded in fiscal year 2009 and QRC-2 late in fiscal year 2010.

While preparing for deployment, QRC-2 Soldiers tested their Gray Eagle UAS in a limited user test, May 22 through June 4, 2010. During the test, 17 Soldiers demonstrated to the Army Test and Evaluation Command and the Training and Doctrine Command capa-

bilities manager, that they had learned how to effectively employ the system. The test provided the Army with vital information about the system, the training required to field it, and how to best use its capabilities in combat.

The test also debuted the operator's use of beyond line-of-sight via SATCOM control of both the aircraft and payload. QRC-2 supported ground units at the National Training Center in much the same way they will when they deploy. They flew day and night—often for long periods of time without landing—up to 19.9 hours on one sortie.

The 12 operators of the unit, swapping between aircraft operator and payload operator, worked 24/7 to support the mission. In a historic moment, they

fired the first Hellfire II UAS Variant from a Soldier-operated ER/MP aircraft. In total, they would fire six missiles, some where they laser-designated the target themselves, and two where the target was designated by an Apache helicopter flying in the vicinity. They also provided laser-designation for an Apache to fire two Hellfire missiles.

This test was the first operational test for the ER/MP and was designed to show the potential for the system to meet design requirements for the mission. ♦

*—Jeffrey Crabb, deputy product manager/UAS Project Office*





## *SUGV puts eyes on the enemy*

Maj. Deanna Bague



Soldiers from 1st Combined Arms Battalion, 5th Brigade, 1st Armored Division, walk behind the Small Unmanned Ground Vehicle during a gunnery exercise at Doña Ana Range, N.M.



An Army Evaluation Task Force Soldier equipped with a Small Unmanned Ground Vehicle takes cover in an arroyo during a test exercise at Adobe Village, White Sands Missile Range, N.M.

THE Small Unmanned Ground Vehicle allows Soldiers to send robotic “eyes and ears” into potential danger areas while minimizing risk.

The SUGV is a small, man-packable robotic system weighing about 31 pounds. Each system consists of an operator control unit, a robotic chassis platform with video capability, digital communications/audio relay modules (plug in/out), and advanced sensors/mission modules. It has both a soft case that can be carried by a Soldier like a backpack, and a rugged storage container used to transport the system.

While unattended ground sensors help Soldiers and commanders gain a clearer picture of the battle space around static positions, they must be manually placed and cannot move around potential threats. Sometimes

Soldiers hunting for the enemy in both urban and tactical environments need the ability to examine potential threats safely, and track the enemy into enclosed spaces; the SUGV gives them this ability.

Recent improvements in the SUGV include improved radio range and network connectivity, improved environmental qualification testing, and improved imagery from the sensor to the network workstation, with an emphasis on increasing the night infrared range for target recognition and research to further reduce the weight of the system.

The strength and durability of the SUGV’s sensor neck, the strength of all brackets and latches and the ruggedness of the video camera in the payload were improved in response to testing evaluations. Soldier-driven improve-

ments included more rigid flippers to keep the tread from coming off and a redesigned transit case to better protect the antenna.

The SUGV, the Urban Unattended Ground Sensor, Tactical Unattended Ground Sensor, and the Class I Unmanned Aircraft System will be networked to give Soldiers and commanders the best situational awareness possible on the battlefield.

The Army is scheduled to field the first set of new unmanned vehicles and sensors, including the SUGV, to the 3rd Brigade Combat Team, 1st Armored Division at Fort Bliss, Texas, this year. Follow-on BCTs will be equipped with these systems based on Army Force Generation. ♦

—PEO Ground Combat Systems





## *UH-72A Lakota: expanded roles, missions*



**T**HE UH-72A Lakota Light Utility Helicopter is the Army's newest helicopter. On June 30, 2006, the Army awarded a contract to EADS North America to deliver and support the Lakota. It is replacing aging UH-1 and OH-58A/C aircraft in use by the Army National Guard and at test and training centers across the U.S. and its territories, as well as in Germany.

The Lakota is unique because it is a variant of a commercial aircraft, the Eurocopter EC-145. The UH-72A is Federal Aviation Administration certified. It is flown and maintained in accordance with FAA requirements, and everything on the aircraft (except for the ARC-231 secure radio) is commercially available and certified by the FAA. The Lakota is intended

to fly in non-hostile and permissive environments, which allow the civil certification. This concept aided the rapid acquisition and fielding of the UH-72A.

The EC-145 is a modern twin-engine aircraft. The standard configuration carries two pilots and up to six passengers, and the MEDEVAC configuration has two pilots, up to three passengers and two litters that are mounted to the floor. The MEDEVAC aircraft also has racks to support the carriage of equipment such as defibrillators, pumps and IV bottles.

In the last year, to further increase the capability of the UH-72A, two major mission equipment package kits were being developed: one for the National Guard's security and support battalion mission, the other

to support training at the combined training centers at Fort Irwin, Calif., Fort Polk, La., and in Germany.

The S&S BN MEP includes an electro-optical sensor, searchlight, laser pointer and equipment for displaying and downlinking data. The CTC MEP has more radios, a loudspeaker and equipment to simulate shooting and being shot at.

The UH-72A Lakota has quickly been deployed with the Army, providing improved capability and availability. There are more than 100 Lakotas flying with National Guard and Army units today, and they have amassed more than 30,000 flight hours. An additional 80 aircraft will enter service by the end of this year and by 2016, 345 total will be in use. ♦





## *Army developing Soldier-wearable battery*

**T**HE Army is developing a thin rechargeable battery that will conform to the shape of the protective plate worn in Soldier vests.

The new Soldier Conformable Rechargeable Battery configuration more efficiently distributes weight, reduces bulk, and does not take up any usable space on the Soldier's load-bearing vest. The SCRB uses state-of-the-art, prismatic lithium-ion cell technology to achieve the thin battery profile that can provide power to Soldier C4ISR devices.

The SCRB being developed by the U.S. Army Research Development and Engineering Command started as a Small Business Innovative Research topic, and has transitioned to an Army Technology

Objective program called Power for the Dismounted Soldier. "Soldiers we have shown the prototypes to have expressed a desire to use this type of battery, so we will continue to pursue these types of ergonomic power source design concepts," said George Au, one of the SCRB project engineers at the Communications-Electronics Research, Development and Engineering Center.

The Soldier evaluation phase, run by Project Manager Soldier Warrior, began in November 2010 at Fort Reilly, Kan. Small quantities of SCRB designs from five vendors are slated to participate in a limited user test, powering the NETT Warrior integrated Soldier system.

In addition to evaluating the conformal battery concept, prototype

300-watt fuel cells will be used by Soldiers to recharge the SCRBs during the event.

So how can battery quantities and demand for recharging be reduced? "The form factor benefits the SCRB provides lends itself to being hybridized with a small 25 watt fuel cell that is also being developed," Au said. He projects that a SCRB/Fuel Cell hybrid power source could support a 72 hour mission before recharging is needed. ♦

—ARDEC





## *New fuel cells provide expanded mission capability*

**R**ESearchERS have developed two fuel cell solutions that will allow Soldiers to run longer missions with more flexibility and greater safety and security.

Engineers from the U.S. Army Tank Automotive Research, Development and Engineering Center at the Detroit Arsenal in Warren, Mich., have developed, in conjunction with Adaptive Materials Inc., new fuel cell applications for small unmanned ground vehicles, specifically, PackBots. TARDEC is also developing a fuel cell-based auxiliary power unit that fits under armor in an Abrams Main Battle Tank, to run electronics while providing true silent watch capabilities.

Soldiers who once had to halt their mission to replace or recharge batteries in PackBots (used to detect roadside

bombs or conduct camera surveillance), will now have a propane-powered fuel cell that extends operational capabilities and dwell times for these critical missions.

The 150-watt fuel cell powering the UGV uses the same kind of propane fuel as the average backyard barbecue. One propane canister has the same mission duration as at least three lithium-ion batteries, which greatly extends a PackBot's mission scenario.

If a Soldier has to recharge a battery, the PackBot mission stops. "The fuel cell allows for five times longer mission lengths and lets the Soldier swap propane tanks quickly, reducing down time," Kevin Centeck, TARDEC engineer, pointed out. "It will enable long persistent stare missions to be conducted and get us closer to meeting

the 24-hour mission requirement that was previously not obtainable."

The fuel cell-based APU under development will deliver silent power to vehicle electronics. This APU produces 10 kilowatts of power from JP-8 fuel in the Abrams tank. The fuel cell-based APU takes the burden of providing power for electronics off the main engine, and reduces overall vehicle fuel consumption by not requiring the engine to idle for vehicle power while stationary.

The new APUs have a modular design that can fit a wide variety of space configurations on various vehicles, eventually allowing for common technology solutions across multiple vehicle platforms. ♦

—Dan Desmond and Eric Traver/TARDEC

Marine Corps Cpl. Michael J. Ayotte



Marine Corps Lance Cpl. Alfredo Ruiz, assigned to 2nd Combat Engineer Battalion, 2nd Marine Division, briefs fellow Marines and Sailors on the PackBot tactical robot at Camp Dwyer in the province of Helmand, Afghanistan. The PackBot robot is designed to find, identify and dispose of improvised explosive devices.

Eric Traver



TARDEC engineers Dan Maslach (left) and Kristin Wing load a propane canister onto a PackBot as they test the new fuel cell power source. The propane-based fuel cell provides energy equal to at least three lithium-ion batteries, extending the duration of PackBot missions.





## *Winning wars with the power of the sun*

**I**N the summer of 2009, paratroopers from the 82nd Airborne Division's reconnaissance company, Charlie Troop, 5th Squadron, 73rd Cavalry, discovered 25 solar-powered water filtration machines locked up in an old hangar at Forward Operating Base Hammer, east of Baghdad.

The delivery date was from the prior year, with a thick coat of dust present as evidence of the time that had passed. Several civil affairs Soldiers had tried to revive the project over the course of the previous year, in an effort to get continuous water to the Iraqi population the Soldiers had been protecting.

Within a couple of weeks, the paratroopers had the machines up and running, a relationship established

with one of the machine manufacturers in the U.S., and command support. Most importantly, they had high-level Iraqi government buy-in for a device that could provide 30,000 gallons of purified water per day—created by the power of the sun—without a single drop of gas or oil.

Within the first month of finding those machines, Charlie Troop, under the command of one of its executive officers, delivered the first machine into the outskirts of Sadr City, one of the most dangerous regions of Iraq. The village leader said, “Saddam couldn’t get us water. Bin Laden couldn’t get us water. Muqtada Al-Sadr couldn’t get us water. Now, the American Soldiers have finally brought us water.”

The replacement unit, the 1st

Advise and Assist Brigade, 3rd Infantry Division, picked up where Charlie Troop left off. The machines are still in operation, and the villages are maintaining them on their own with minimal U.S. support, more than one year after the first delivery.

When someone asks whether the U.S. has been successful in Iraq, we can tell the story of solar-powered water filtration technology, and Soldiers working with the Iraqi people to help them survive on their own. ♦

*The author, Maj. Jesse R. Stewart, was the commander of Charlie Troop. He is currently a fellow in Counter-Insurgency at the Command and General Staff College at Fort Leavenworth, Kan.*







## *Showers reducing water delivery burden*

**T**HE Force Provider Team, part of the Product Manager Force Sustainment Systems office, has designed and developed a state-of-the-art Shower Water Reuse System.

The SWRS is a rapidly deployable, mobile, self-sustaining system, capable of recovering up to 9,000 gallons per day of shower wastewater. This capability increases the Army's ability to reduce the logistical and security burden of water delivery to forward operating bases and combat outposts.

Product Manager Force Sustainment Systems has delivered the first eight SWRS units for deployment to Afghanistan as part of an add-on capability to the Force Provider base camp modules. Force Provider modules, affectionately known as the Army's Home Away from Home, provide billeting; personal hygiene; laundry; morale, welfare and recreation; and a field feeding capability for 600 Soldiers. The Force Provider team works to continually improve the quality of life for Soldiers in the field.

Additionally, U.S. Forces Afghanistan had a need for standardized Army equipment that reduced the logistics footprint at their base camps, particularly since the troop surge, which had a multiplier effect on troop sustainment. As a result, the Army has allocated additional funding to support a request for 80 more SWRS systems that will be used throughout Afghanistan.

The 75 percent recovery rate of the SWRS will translate to a tremendous cost savings to the Army, considering some estimates put the cost of usable water at the tactical edge in Afghanistan at nearly \$20 per gallon.



The SWRS uses self-cleaning filters and reverse osmosis technology, combined with an easy-to-use, touch-screen LCD user interface. The wastewater is first filtered through a 15 micron pre-filter and two 0.2 micron microfilters, followed by three 8-inch saltwater reverse osmosis elements. This water is then filtered further through two carbon filters, exposed to bacteria-killing UV light, and finally shocked with calcium hypochlorite to prevent coliform growth.

The SWRS is housed in an 8 by 8 by 6.5-foot triple container, or TRI-CON, and weighs less than 8,000 pounds. It is capable of unattended

operation for up to three days, and water quality is continually monitored through conductivity sensors. The touch-screen display gives the user visibility of real-time flows and pressures, set-up and operating instructions, and troubleshooting procedures. The system is operational in temperatures from 120 degrees F down to -15 degrees F, with an add-on cold weather kit. ♦

*—PM Force Sustainment Systems, Project Management Force Projection, PEO Combat Support and Combat Service Support*





## *Key to energy security: renewable energy projects*



**T**HE Army has implemented a broad range of projects to meet its goals for 7.5 percent substitution of renewable energy by 2013. The projects listed are examples of the Army's continuing effort to improve energy security.

The Army has three hydropower facilities and has implemented 28 solar projects in 16 states, Germany and Italy.

The Army National Guard Training Center in Sea Girt, N.J., constructed a photovoltaic solar electric power parking canopy system.

A Fort Bliss, Texas, solar energy project supplies electricity to an administration building, which allowed Fort Bliss to partially remove this building from the grid.

The Nevada Army National Guard is constructing solar shade structure arrays at Carson City and Las Vegas.

Fort Carson, Colo., constructed a solar array on 12 acres of a closed landfill—the Army's largest solar power site.

Fort Knox, Ky., harvests biogenic renewable methane gas from Devonian-shale.

Tooele Army Depot, Utah, installed solar walls on 14 buildings, and has the first wind turbine at an active Army installation. The Army has other wind turbine projects in seven states.

Fort Drum, N.Y., installed solar wall preheat panels, providing solar heated ventilation air.

Other solar wall and thermal projects were implemented in 11 states, Puerto Rico and Belgium. Projects included solar walls, day lighting, solar roof tiles and solar tubes for heating.

Fort Richardson, Alaska, developed a project creating energy production from a low maintenance used vegetable oil filtration and oil burning system.

Fort Bragg, N.C., chose to use a simple chilled water system at night, producing a surplus of cold water to provide additional cooling capacity.

The Army has more projects in the initial phases of planning. The number and size of the projects will expand as the Army works to triple its renewable energy production on installations, and works with private developers and partners to create more than 1,500 megawatts of renewable energy power by 2017. ♦

*The author, Doug Waters is manager, Renewable Energy and Net-Zero Energy Installations Program, Facilities Policy Division, Office of the Assistant Chief of Staff for Installation Management*





## Energy harvesting

**E**NERGY harvesting (also known as power harvesting or energy scavenging) is the process by which energy is derived from external sources (e.g., solar power, thermal energy, wind energy and kinetic energy), and captured and stored. The fuel for energy harvesting is naturally present and is therefore considered free.

A driving force behind the search for new energy harvesting devices is the desire to power sensor networks, unmanned vehicles and mobile devices, without batteries. These systems are often very small and require little power, but their applications are limited

by their reliance on batteries. Scavenging energy from ambient vibrations, wind, heat or light could enable these devices to

function indefinitely. A prototype is in development at White Sands Missile Range, N.M., that replaces wired test instrumentation with a wireless, self-powered, self-organizing and self-healing network of sensor nodes, designed to be embedded and assembled into unmanned ground and aerial systems. Energy to power these sensor nodes is scavenged from ambient vibration and heat energy, converted into electrical energy, providing the energy to support critical test functions.

This system could be used to replace battery packs found on Soldiers' radios and would reduce the load they have



to carry into combat. In addition, the scavenger nodes could be incorporated into tactical vehicles and systems, replacing cumbersome alternative power units and reducing the weight of the vehicle, which correlates to less consumption. ♦

— F.A. Macias/Test Resource Management Center



## Solar technology for Soldiers

**T**HE Army has developed a lightweight solar rucksack kit that enables Soldiers to harvest energy from the sun and multiple battlefield power sources.

The Rucksack Enhanced Portable Power System, or REPPS, uses a foldable, anti-glint, 65-watt solar panel and connectors to convert energy from the sun into power for recharging batteries, or to directly power radios, laptops, surveillance cameras and reconnaissance devices.

The REPPS was developed by the U.S. Army Research Development and Engineering Command's Communications, Electronics, Research, Development and Engineering Center, with valuable input from Soldiers. Operational assessments during development led to the addition of a NATO plug to tap into vehicle power, and an AC wall plug that can be used in urban environments or on forward operating bases.

"Feedback from Soldiers provided

valuable information in deciding the most critical battery types to make charging adapters for, taking full advantage of the capabilities the system offers," said Tony Bui, the REPPS project engineer with the Command and Control Directorate's Army Power Division.

So far, 75 of the 725 kits that are being developed will be provided to various infantry divisions and brigade combat teams. Eighty kits will be delivered within a few months to the Joint Readiness Training Center at Fort Polk, La., for rotating units to train on before deploying with them to Afghanistan.

So what's next on the renewable horizon? Based on the success of the REPPS, CERDEC is developing a renewable energy-in-a-box system that includes solar panels, a small commercial wind turbine, and an energy storage package (with DC to AC inverter) that will provide higher power for use



at small combat outposts or mountaintop retransmission sites. Targeting 350 watts of output power and a two-man lift weight of 120 pounds, the Reusing Existing Natural Energy Wind and Solar system was scheduled to begin operational assessments in December. ♦

— Communications, Electronics, Research, Development and Engineering Center, ARDEC



## *Geothermal exploration leads to green power at Hawthorne AD*

**T**HE Army is using funding from the Energy Conservation Investment Program to conduct exploration for geothermal (high temperature hot water) resources at Hawthorne Army Depot, Nev.

The ECIP is normally used to fund energy conservation and renewable energy projects at Army installations. Through a cooperative agreement with the Office of the Secretary of Defense, ECIP funds are being used to accomplish geothermal test wells in order to determine the presence of a hot water resource suitable to operate a 30-megawatt power plant.

The ultimate goal is to use the exploration results and confirmed re-

source to attract a third-party developer to build and operate the proposed power plant.

Additionally, the plant would greatly lessen the carbon footprint of a similar fossil-fuel plant, and could provide electric power to support the mission in the event of grid failure. This green power supports Army renewable energy efforts to meet federal standards.

The plant planned at Hawthorne will be patterned after the Navy Geothermal Program Office operation at China Lake, Calif. That plant has operated for more than 20 years, and produces peak power of 250 megawatts. The power is sold to the local electric grid, which distributes it to users.

Exploration at Hawthorne is based on preliminary surface testing conducted by the GPO. Surface soils analysis, 3-D sound testing and flyover observations revealed characteristics that strongly suggested the presence of a subsurface geothermal resource. Development of the power plant is one of the secretary of the Army's energy initiatives. ♦

— *Geothermal Program Office*

### GEOHERMAL TEST HOLE SITE

Project Coordination:

U.S. Department of Army

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### **Sgt. 1st Class Jarrett Jongema**

In 2004, while deployed in Iraq, Sgt. 1st Class Jarrett Jongema suffered serious, life-threatening injuries. Fellow unit member Sgt. Maj. Scott Wilmont recalls, "He had to be resuscitated four times. He just wouldn't give up." And he still hasn't. After a long and arduous rehabilitation, Sgt. 1st Class Jongema accepted a position as an assignment manager at Human Resources Command where he helps new Soldiers find

the best fit for their service. His love for the Army and his commitment to making each Soldier's experience the best that it can be is helping the Soldiers and keeping the Army strong. Sgt. 1st. Class Jongema is also an ardent supporter of, and public speaker for, the Wounded Warrior Program. Where does he find the strength to keep going? "I do what I do because I believe in our Army and in our Soldiers."

**The Nation's strength starts here.**



# gear UP! FOR ICY TRIPS

- During daylight, rehearse emergency maneuvers slowly on ice or snow in an empty lot.
- Steer into a skid.
- Know what your brakes will do: Firmly press antilock brakes, pump non-antilock brakes.
- Don't idle for a long time with the windows up or when in an enclosed space.
- Always take food, water and blankets.
- Have plenty of fuel.
- Let someone know your route and when you arrive safely.

ARMY SAFE  
**FALLWINTER**  
NO TIME TO CHILL



ARMY SAFE  
IS ARMY STRONG







## ELECTROMAGNETIC SPECTRUM MANAGER

Help ensure our forces achieve Full Electromagnetic Spectrum Dominance on the battlefield. The Signal Regiment is seeking interested Staff Sergeants to convert into Military Occupational Specialty 25E (Electromagnetic Spectrum Manager). Soldiers who meet prerequisites and are interested in this dynamic and dedicated MOS may reenlist for reclassification or submit a DA Form 4187 through their chain of command.

To learn about prerequisites, course attendance, and emerging career opportunities, log onto: <https://www.us.army.mil/suite/page/838> and follow the link to Electromagnetic Spectrum Management Operations.



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